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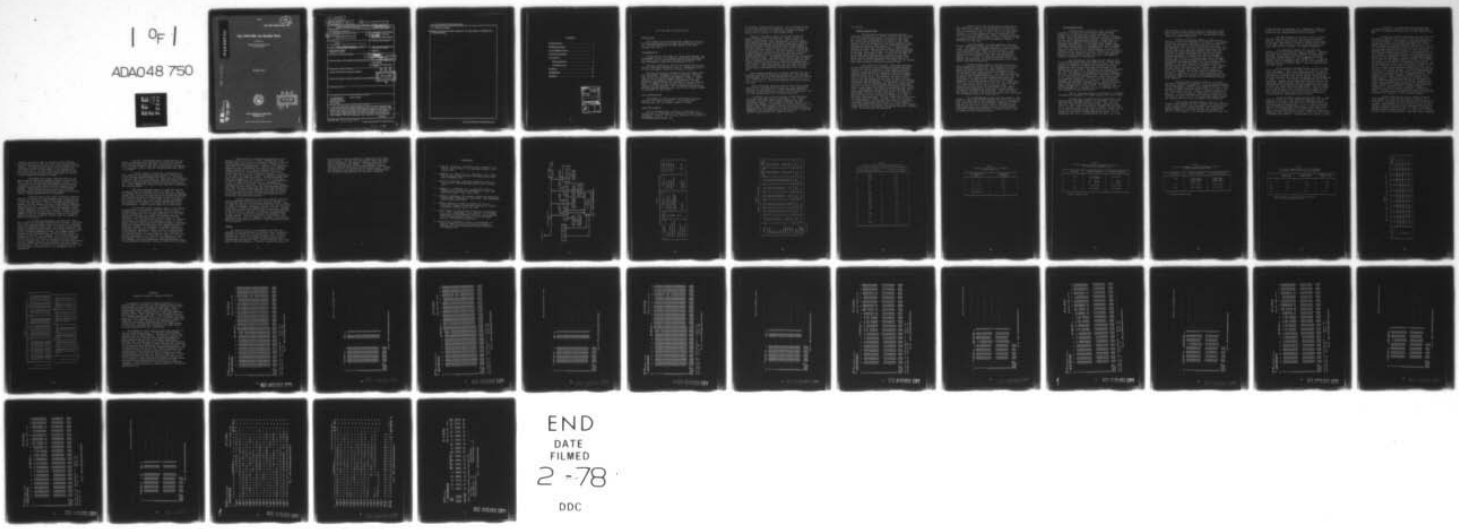

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NRL Memorandum Report 3652

The 1976 NRL Air Quality Data

A. STAMULIS

Radiological and Environmental Protection Staff

November 1977

NAVAL RESEARCH LABORATORY
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Air quality data obtained during the calendar year 1976 at the NRL air monitoring site are reported for ozone (O_3), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), total hydrocarbons (THC), methane (CH_4), non-methane hydrocarbons (RHC), carbon monoxide (CO), wind speed, and wind direction. The instruments measuring the above variables are interfaced to a data acquisition system including a magnetic tape recorder. The input on the magnetic tape is in 5-minute increments (averages) for one month's accumulation of data. Subsequently, a computer printout is

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20. ABSTRACT (Continued)

available for reporting the monthly air quality data. The yearly summary is a composite version of the monthly data.

CONTENTS

The 1976 NRL Air Quality Data

INTRODUCTION

This report is the second annual summary of the air quality data measured at the NRL air monitoring station (1). The period covered in this report is for the calendar year 1976.

INSTRUMENTATION

A description of the NRL air monitoring station, the instruments in use, the computer program for handling the air quality data, and other pertinent information have been discussed in previous publications (2,3,4).

The main features of the air monitoring station are shown in the block diagram of Fig. 1. Additional details of the instruments in use are included in Table 1.

The data acquisition system accepts the output from each instrument, averages it over a 5-minute interval, and records the average on the magnetic tape. A single tape is used to store averaged data for a month. Subsequently, the magnetic tape is submitted to the NRL Research Computer Center for analysis of the air quality data. An example of the monthly computer printout is included in the Appendix. The air quality data from the monthly computer printouts are used for the annual summary as presented in this report.

VALID OBSERVATIONS

The number of valid hourly observations for each variable are listed in Table 2. It is from these observations that the annual summary is based.

POLLUTION SOURCES

The surrounding area in which the Laboratory is located may be considered as a commercial-light industry-residential complex, and includes portions of the District

Note: Manuscript submitted November 7, 1977.

of Columbia, Maryland and Virginia. It is bounded on the north by Bolling Air Force Base, on the east by Route 295, on the south by the D. C. Blue Plains Sewage Treatment Plant, and on the west by the Potomac River.

Within a three-mile radius of the Laboratory the major emission sources include air traffic, heating plants, incinerators, road traffic, power plants, and space heating units. More specifically, the air traffic over NRL and the nearby air corridor consists of approximately 480 take-offs and landings from the Washington National Airport. The peak air traffic times correspond to the peak road traffic occurring during the morning and evening rush hour periods. The road traffic on Route 295 is approximately 50,000 vehicles per week day, and about 92,000 vehicles across the Wilson Bridge (Route 495-Washington Beltway). On weekends the traffic is considerably less on both routes. The peak road traffic times on Route 295 is between 6:00-9:00 a.m. during the morning rush hour traffic and from 3:30-6:30 p.m. during the evening rush hour traffic. The road traffic into the Laboratory varies from 3,500 to 4,500 vehicles per day with most of them parked within the Laboratory during most of the working day.

Most heating plants have a regular schedule for soot blowing (blowing the tubes) during the day. For the NRL heating plant the soot blowing schedule is every four hours, i.e., 12:30 a.m., 4:30 a.m., 8:30 a.m., 12:30 p.m., 4:30 p.m., and 8:30 p.m. For other heating plants the schedule may vary.

Other infrequent emission sources that do not occur daily or on a routine basis include (a) fire suppression exercises at the nearby D. C. Fire Department Training Facility (across Route 295 and east of the Laboratory), and (b) road asphalting and roof tarring operations.

In general, all of the pollution sources mentioned above emit the same class of pollutants, i.e., carbon, nitrogen, and sulfur oxide gases, hydrocarbons, and particulate matter. For a given pollutant, ambient concentrations depend on variations of pollution sources, i.e., number, type, and strength, distance from source to air sampling site, and variations in meteorological conditions. Demographic and topographic features also tend to bias the ambient concentrations of a given pollutant.

AIR QUALITY

Meteorological Data

The percent occurrence of prevailing wind directions during 1976 is listed in Table 3 and is based on 7,295 hourly observations. As shown in the table, the first five prevailing wind directions, NNW, calm, SW, W, and SSW occurred about 57 percent of the time. Further, with the exception of the calm condition, these wind directions are, with respect to the NRL air monitoring site, from the Virginia sector. Consequently, emission sources from this sector would tend to bias the air quality data. Conversely, the least prevailing wind directions, according to Table 2, are from the ENE, SE, E, and ESE and occurred about 7 percent of the time. Hence, pollution sources from these directions, like motor vehicle exhaust emissions from road traffic on Route 295, were not significant in biasing the air quality data except perhaps for short periods of time.

As a matter of interest, sufficient knowledge is now available so that, knowing the prevailing wind directions and the location of some pollution emission sources, it can be shown that an air monitoring site could be chosen within the immediate area where higher concentrations for a given pollutant could be obtained than is now the case. For example, air quality data from an air monitoring station, east of Route 295 and across from the Laboratory, would be biased by pollutants from motor vehicle exhausts. In addition, a site located at the foot of the Wilson Bridge (Route 495-Washington Beltway), either on the Maryland or Virginia side, would tend to have higher pollutant concentrations than the NRL site. Consequently, the evidence so far indicates that the present location of NRL, with respect to some air pollutants, could not be more favorable. This does not mean that NRL is not occasionally subjected to high pollutant concentrations, but that these are not sustained for long periods of time. However, even low pollutant concentrations at long periods of time may act adversely on humans, vegetation, and surfaces. In one example, some accelerated preliminary tests have shown that exposed copper and silver test panels can become severely tarnished by SO_2 in the ambient NRL atmosphere.

Table 4 lists the percentage of occurrence of wind speeds in terms of wind speed groups during 1976. The data reveal that about two-thirds of the wind speeds that occurred were below 7.4 mph. This is a high percentage of low wind speeds and agrees reasonably well with the 1975 wind speed data. This is worrisome because if it is a typical meteorological feature then one of the prerequisites for air pollution episodes is readily available in this area.

Low wind speeds, or calm, generally occurred between sundown and sunup and increased in velocity about 7 a.m. The higher wind speeds generally occurred between sunup and sundown and peaked by late morning or the early afternoon hours. When calm or low wind speeds extend into the sunlight hours, then the possibility exists for the buildup of pollutant concentrations in ambient air. In fact, for most pollutants, some of the highest concentrations occurred during calm or low wind speed conditions during 1976.

Another meteorological condition observed at the air monitoring station was the frequency of surface-based temperature inversions. The principle used for measuring these inversions has been published in an earlier publication which describes an indirect method for observing this phenomena (5). The method relates the buildup of the natural radioactivity of the soil into the atmosphere with surface-based temperature inversions. According to the NRL method, a typical surface-based temperature inversion starts about 4:00 a.m., peaks about 8:30 a.m., and is broken up by 2:00 p.m. This occurred for a high percentage of days during the year. It is difficult to give a definite percentage of the times surface-based temperature inversions occurred because of problems in counting weak inversions. Weak inversions are defined as those inversions that show slight deviations from background levels of radioactivity.

It is interesting to note that air traffic, road traffic , and surface-based temperature inversions peak at about the same time in the mornings. Even so, abnormally high concentrations of the pollutants, measured at the station, do not occur at this time as one might suspect. Other conditions are necessary, such as wind direction, subsidence temperature inversion (inversion aloft), and a stagnating high pressure system.

Air Pollution Data

In reporting air pollution data, it is always a difficult choice in deciding which time-averaging periods are of interest for a given pollutant. For example, the time-averaging periods may include 5-minute, 1-hour, 3-hour, 8-hour, daily, monthly and yearly averages. For the short time-averaging periods, a large amount of data may be accumulated, the analysis of which may be laborious and tedious. On the other hand, longer time-averaging periods result in averages which tend to dampen short term fluctuations in concentration. In a written report of this size only a limited amount of data can be reported and in such a way that it reflects the air quality pattern for the calendar year 1976. For a more detailed analysis of the data, the input stored on the magnetic tapes is available for future use.

One approach in reporting the air quality data is to determine the number of times certain concentration levels are exceeded in a given period of time. For this purpose, a number of criteria and standards have been established for certain pollutants of interest on the federal and local level. The federal air quality standards are listed in Table 5 for those pollutants measured at NRL (6). The District of Columbia air quality standards, for those pollutants measured at NRL, are listed in Table 6 (7). For both sets of standards, the NO_2 levels were not exceeded during 1976. For CO, the 8-hour standard (federal) was exceeded once (January). The District of Columbia SO_2 secondary standard for the annual arithmetic mean, 0.020 ppm (v/v), was exceeded at NRL where the yearly average was 0.027 ppm (v/v). In addition, the 24-hour secondary D. C. standard for SO_2, 0.086 ppm (v/v), was exceeded 28 times during 1976.

For O_3, both the federal and District of Columbia standards were exceeded 107 times during 1976, all in July.

Another set of values for air pollutants is the Metropolitan Washington Council of Governments (COG) air quality index criteria listed in Table 7 (8). For the NRL data, none of the COG criteria were exceeded during 1976. In fact, none of the hourly averages for SO_2, NO_2, or CO were even close to the COG air quality index criteria. The 1-hour O_3 concentrations came close to, but did not exceed the COG alert criteria during the year. It is suspected that the O_3 concentrations are kept low at NRL

and vicinity because plumes from the nearby coal-fired electric power plant contain chemical scavengers which react with O_3 and tend to keep its concentration levels lower than might be expected.

Besides knowing the number of times the air quality criteria and standards are exceeded for any given pollutant, it is also important to be able to establish trends and patterns of pollutant behavior that are characteristic for the site at which the air quality data are obtained. For some time-averaging periods, such as monthly and yearly averages, several year's data are required for establishing seasonal and yearly trends. With this in mind, the monthly and yearly averages obtained during the calendar year 1976 are listed in Table 8 for ozone (O_3), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), total hydrocarbons (THC), methane (CH_4), non-methane hydrocarbons (RHC), and carbon monoxide (CO). Generally, only RHC averages are usually listed in tables such as Table 8 but, for purposes of this report, the THC and CH_4 averages are also listed in the table although there are no standards for these gases, as such. For example, CH_4 is not normally considered a pollutant. However, it is felt that knowledge of THC and CH_4 averages for various time-averaging periods can be helpful, either as tracers or establishing pollutant plume behavior.

From the data listed in Table 8, it is seen that the O_3 averages are generally low but peaking during the warmer months. Normally, O_3 concentrations are higher in the afternoon hours than other times of the day so that monthly or yearly averages which include all times of the day would tend to be low. However, monthly averages for O_3, or for other pollutants, emphasize a seasonal trend. However, for other pollutants the seasonal trend may vary from year to year. For O_3, the spring and summer months are usually the ones with the highest concentrations.

For the SO_2 averages listed in Table 8, the seasonal trend appears to be for higher SO_2 concentrations in the cooler months (fall and winter) and significantly lower averages in the warmer months. The same general pattern appears to hold true for the NO_2 averages in Table 8. One reason for the seasonal trend for these two

pollutants may be increased fuel consumption during the colder months. Meteorological patterns may be another reason for the seasonal trend for SO_2 and NO_2.

The RHC averages, as lited in Table 8, reveal that the peak months for 1976 were during the warmer seasons. This is particularly unfortunate because this is the same time period in which O_3 concentrations tend to be high. RHC, it will be recalled, are precursors, along with NO_2 and sunlight, for oxidant formation.

It is generally agreed that the main RHC emission source is from motor vehicle exhausts. However, CO, which is a characteristic emission of motor vehicle exhausts, shows monthly trends that do not correlate well with the RHC averages. This suggests that other emission sources tended to bias the RHC data. It may be, though, that the atmosphere may not be as well-mixed for some pollutants as others, even if they are emitted from the same source.

The CO monthly averages listed in Table 8 range from a low of 0.33 ppm (v/v) (July) to a high of 2.67 ppm (v/v) (November). As a rough approximation, low concentrations of CO occurred in the spring and the higher concentrations occurred in the cooler months. Even though the ratio between the high and low monthly CO concentrations is high, i.e., 8.1, the actual concentrations are in the low range. Higher values would have been obtained if the prevailing wind directions had been easterly so that the influence of motor vehicle exhaust emissions from traffic on Route 295 would have been significant. This is another way of saying that if the Laboratory were located on the other side of Route 295, the CO monthly averages would have been higher than those shown in Table 8 because of the influence of prevailing wind directions.

Since pollutant concentrations vary over a large range of values in a long period of sampling time, it is reasonable to expect that some time-averaging periods shorter in duration than one year or one month would have high pollutant concentrations. In fact, most pollutants have concentrations that approximate a log-normal distribution. As a consequence, in a large array of data of short time-averaging periods (short compared to the total sampling time), there will usually be only one period with a maximum concentration. Some examples are shown in Table 9.

In Table 9, the maximum concentrations that occurred during each month for various time-averaging periods of interest are listed for O_3, SO_2, NO_2, CO, and RHC.

There are several interesting features that are not readily apparent in the data listed that are worth further discussion. For example, in any given month for a given pollutant, the maximum concentrations did not necessarily occur with the sampling time, i.e., the 5-minute maximum concentration did not necessarily occur in the hour with the maximum concentration, or within the 24-hour maximum concentration period, or that the 1-hour maximum concentration period did not occur within the 24-hour maximum concentration period. One explanation for this feature of pollutant behavior is that pollutants are present in the atmosphere as puffs or fragmented plumes rather than as continuous, coherent plumes. For example, in a parcel of air sampled over an hour, for a given pollutant, and having a low background concentration, one may envisage that within this time period a spike or puff of the pollutant of interest is injected so that, as a result, a high 5-minute maximum concentration is obtained but with a low hourly average. The above example may be compared to a similar situation where the pollutant puff is of lower concentration and of longer duration. Consequently, the hourly average concentration in this example will be higher than the hourly average in the first example. The same argument can be expressed for other time-averaging periods. Therefore, it may be concluded that pollutants are present in the atmosphere as puffs (segmented or fragmented plumes), semi-contiguous plumes, or as contiguous puffs (coherent plumes). Variations in meteorological conditions, distance of emission source to air sampling probe, and variations in number, type and source strength of emission sources will determine the character of the pollutant plumes.

Another feature that is not readily apparent from inspection of the data in Table 9 is that, for a given month, the times in which the maximum concentrations occurred is not necessarily the same for all of the pollutants. For example, the day or hour in which the SO_2 5-minute maximum occurred is not necessarily the same as the day or hour in which the NO_2, O_3, RHC, CO, 5-minute maximum concentrations occurred. In other words, because of variations in meteorological conditions and in emission

sources, the time of day or the day in which maximum concentrations occur may also vary from one pollutant to another. Variations in the time in which maximum concentrations occur may also be due to the fact that some pollutants are not as well-mixed in the atmosphere as other pollutants. In fact, the mixing capacity of the atmosphere may determine whether pollutants are present in the atmosphere as puffs or plumes.

According to the data listed in Table 9, the most clear-cut trend for seasonal behavior is shown by CO for all of the time-averaging periods listed. It is clear from the CO data that the maximum concentrations occurred in the winter months and that January had the highest concentrations for all of the time-averaging periods. Since the principal source for CO is motor vehicle exhaust emissions, this must somehow tie in with high CO concentrations during cold weather.

From the data of the other pollutants listed in Table 9, no trend is as characteristic as is that for CO although a case can be made for RHC (high concentrations in May, June and July). This is interesting because it implies that the emission sources of RHC may be different than those for CO. In other words, motor vehicle exhaust emissions may not necessarily be the predominant source of RHC compounds in this area. However, if motor vehicle exhaust emissions are the primary source of RHC then this suggests that CO concentrations are lower in the warmer months because of a complex chemical reaction scheme in which CO is depleted.

It is also interesting to consider the time of day in which the maximum concentrations occurred. Choosing the 1-hour time-averaging period as a basis for characterizing the favorable time of day, picking the three highest hourly concentrations per month for a given pollutant, and, based on Eastern Standard Time, it was found that, for most of the pollutants measured at NRL, the largest number of maximum hourly concentrations occurred during certain periods of the day. For example, the 1-hour maximum concentrations for O_3 generally were found to occur between 11:00 a.m.-3:00 p.m. This is the most favorable period for O_3 formation since it is a byproduct of the photochemical reaction scheme involving hydrocarbons, nitrogen oxides, and sunlight. Hence, a delay in O_3 formation from the time the precursors are emitted into the atmosphere is not unexpected.

For SO_2, the maximum hourly concentrations are mostly clustered around the 10:00 a.m.-2:00 p.m. period. This does not mean that high SO_2 concentrations do not occur at other times of the day but only that there appear to be periods in which high SO_2 concentrations are likely to be found.

A unique feature of high NO_2 concentration is that there are two periods during the day in which most of the maximum concentrations are found, i.e., 7:00 a.m.-10:00 a.m. and 5:00 p.m.-8:00 p.m. These periods correspond roughly to the morning and evening rush hour traffic, but it is by no means clear that these are the only sources of NO_2. Other combustion sources in the area may be available for this pollutant.

The most favorable period for high THC and CH_4 concentrations occur between 9:00 p.m.-6:00 a.m. This is the longest period found for any of the pollutants measured at NRL, and, it will be noted, does not include the morning and evening rush hour traffic periods (6:00 a.m.-9:00 a.m. and 3:30 p.m.-6:30 p.m.). This leads to the conclusion that sources other than motor vehicle exhaust emissions are responsible for some of the high THC and CH_4 hourly concentrations. These sources remain to be identified.

For the RHC hourly averages, most of the highest concentrations occur between 6:00 a.m.-9:00 a.m. and between 8:00 p.m.-1:00 a.m. The early period corresponds to the morning rush hour traffic emissions, but the late evening period does not include the evening rush hour emissions. The high RHC hourly concentration for the 8:00 p.m.-1:00 a.m. period may be due to delay in transport from emitter to receptor (air sampling probe), or, more likely, sources other than motor vehicle exhaust emissions. These may include emissions from both combustion and non-combustion sources. For example, the sewage treatment plant next door to the Laboratory could be a rich source of hydrocarbon emissions. Other sources of hydrocarbons could include, but are not limited to, (a) incinerators, (b) heating plants, (c) space heating units, (d) fuel and solvent evaporation, (e) aircraft, (f) vegetation, and, for certain times of the year, (g) road asphalting, (h) roof tarring, (i) fire department training exercises, and, (j) painting and caulking of external surfaces of buildings.

High hourly CO concentrations generally occur between 6:00 a.m.-9:00 a.m., which corresponds to the morning rush hour traffic, and between 9:00 p.m.-1:00 a.m. These periods agree closely with those followed by the high RHC hourly concentrations. However, it is generally agreed that the predominant CO source is motor vehicle exhaust emissions, so it must be assumed that the high concentrations of CO during the 9:00 p.m.-1:00 a.m. period must be due to this particular source. If this is so, then there must be a delay in transport from source to receptor (air sampling probe). Another alternate that might be suggested is other sources of CO in the area. To further complicate the problem, it is conceivable that CO may be formed or destroyed in the atmosphere in a complex series of reactions. Therefore, in the morning one might be observing CO from one predominating source(s), while the evening observations might be from another CO source(s). In fact, this argument could also be applied to the hydrocarbon and NO_2 sources since these are the pollutants that also have two periods during the day in which high concentrations prevail.

Further analysis of the data indicates that the 24-hour maximum concentrations can occur on any day of the week for any of the pollutants measured at NRL. This is important because the area within and near the Laboratory is quiet on weekends, especially traffic, so that for some pollutants an additional explanation is required. Besides those explanations included for high hourly concentrations, it may be that an inventory of pollutant concentrations is built up and transported through the atmosphere from faraway places. This may explain why high 24-hour concentrations can occur on weekends; transport of pollutants generated from shopping centers or other jurisdictions may act as sources.

SUMMARY

Air quality data for the calendar year 1976 are reported for the pollutants and meteorological conditions measured at the NRL air monitoring site. The variables measured are ozone (O_3), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), total hydrocarbons (THC), methane (CH_4), non-methane hydrocarbons (RHC), carbon monoxide (CO), wind speed, and wind direction. Monthly computer printouts of

the air quality are available for summarizing the valid observations. For the 1976 air quality data, the information included in the monthly computer printouts were used in compiling the summary. In addition, brief descriptions are given in discussing emission sources and their effect in biasing the air quality data. Trends and patterns of the NRL air quality data, characteristic of the NRL air monitoring site, are also discussed.

REFERENCES

1. Stamulis, Aristides, "The 1975 Yearly Summary of the NRL Air Quality Data", NRL Memorandum Report 3351, August 1976.

2. Stamulis, A., Taylor, R. C., and Piatt, V. R., "The NRL Air Monitoring Station", NRL Memorandum Report 2699, December 1973.

3. Stamulis, Aristides, "The NRL Atmosphere Trends in Air Quality", NRL Memorandum Report 2902, October 1974.

4. Stamulis, A., Flournoy, R. L., and Jones, Lynn K., "Ambient Air Quality Data Management at NRL", NRL Memorandum Report 3261, April 1976.

5. Stamulis, Aristides, "An Indirect Method for Measuring Surface-Based Temperature Inversions", NRL Memorandum Report 2748, March 1974.

6. Federal Register, Volume 36, Number 84, Part 11, "National Primary and Secondary Ambient Air Quality Standards", Friday, April 30, 1971.

7. Annual Report on the Quality of the Air in Washington, D. C. 1974, Government of the District of Columbia, Department of Environmental Services, Environmental Health Administration, Bureau of Air and Water Quality, Air Monitoring Division.

8. Metropolitan Washington Council of Governments Air Quality Index, Air Quality Planning Committee, Regional Air Pollution Advisory Board, Report No. 1, November 1973.

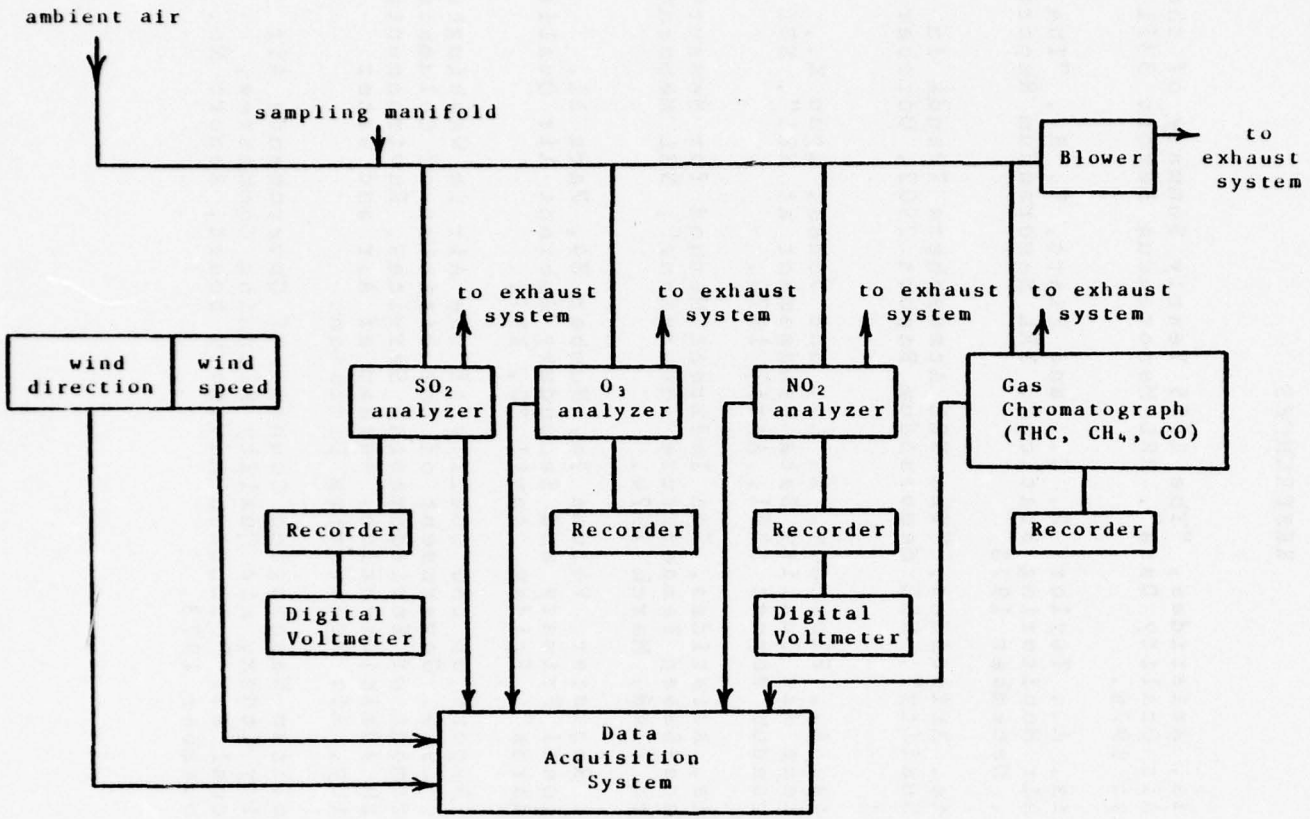

Fig. 1 — NRL air monitoring station

Table 1

Description of Air Monitoring Instruments in Use at NRL

Variable	Symbol	Detector	Type	Full Scale
ozone	O_3	chemiluminescent	continuous	0-0.5 ppmv
sulfur dioxide	SO_2	flame photometric	continuous	0-1.0 ppmv
nitrogen dioxide	NO_2	colorimetric	continuous	0-0.5 ppmv
total hydrocarbons	THC	gas chromatograph-flame ionization	12 analysis/hr	0-30 ppmv
methane	CH_4	"	"	"
carbon monoxide	CO	"	"	"
wind speed	--	aerovane	continuous	0-100 mph
wind direction	--	"	continuous	--

Table 2

Number of Hours of Valid Data

Month	O_3	SO_2	NO_2	THC	CH_4	CO	wind direction	wind speed
January	580	513	532	593	593	593	605	605
February	578	603	603	602	602	602	603	603
March	693	601	612	420	518	518	723	723
April	625	637	652	495	495	495	658	658
May	605	604	532	590	590	590	606	606
June	669	669	669	558	558	558	654	654
July	616	624	676	680	680	680	-	-
August	-	699	647	679	679	679	700	700
September	694	697	141	561	561	696	697	697
October	676	675	677	-	-	599	677	677
November	701	701	680	614	675	675	701	701
December	671	671	670	671	671	671	671	671
Total Hours	7108	7694	7091	6463	6628	7298	7295	7295
% (Based on 8784 hours)*	80.9	87.6	80.7	73.6	75.5	83.1	83.0	83.0

* leap year

Table 3

Percent of Time of Prevailing Wind Directions

Prevailing Wind Direction	% of Time of Occurrence
NNW	12.7
Calm	12.0
SW	11.7
S	10.7
SSW	9.8
N	7.4
NNE	7.4
NW	7.4
SSE	4.3
WSW	3.3
NE	2.9
WNW	2.3
W	2.2
ENE	1.7
SE	1.6
E	1.4
ESE	1.2

Table 4

Percentage of Occurrence of Wind Speed Groups During 1976

Wind Speed Group (mph)	Percentage of Occurrence
0 - 3.4	27.3
3.5 - 7.4	41.2
7.5 - 12.4	21.5
12.5 - 18.4	8.0
18.5 and over	2.0

Table 5

National Ambient Air Quality Standards in ppm (v/v)
for Pollutants Monitored at NRL

Pollutant	Primary Standards	Secondary Standards
SO_2	0.03 (aam)* 0.14 (24-hr)	0.50 (3-hr)
CO	9 (8-hr) 35 (1-hr)	9 (8-hr) 35 (1-hr)
O_3	0.08 (1-hr)	0.08 (1-hr)
NO_2	0.05 (aam)*	0.05 (aam)*

* annual arithmetic mean

Table 6

District of Columbia Air Quality Standards in ppm (v/v)
for Pollutants Monitored at NRL

Pollutant	Primary Standards	Secondary Standards
SO_2	0.029 (aam)* 0.109 (24-hr) 0.323 (1-hr)	0.020 (aam)* 0.086 (24-hr) 0.273 (1-hr)
O_3	0.08 (1-hr)	0.08 (1-hr)
NO_2	0.05 (aam)*	0.05 (aam)*

* annual arithmetic mean

Table 7

Metropolitan Washington Council of Governments
Air Quality Index Criteria (One-Hour Averages)*

	Alert Stage [ppm (v/v)]	Warning Stage [ppm (v/v)]	Emergency Stage [ppm (v/v)]
O_3	0.10	0.40	0.50
SO_2	0.70	1.40	1.85
NO_2	0.60	1.2	1.6
CO	60	90	110

* Table includes only those pollutants monitored at the NRL air monitoring station.

Table 8

Monthly Air Quality Averages in ppm (v/v) during 1976

Pollutant	J	F	M	A	M	J	J	A	S	O	N	D	Yearly Average
O_3	0.013	0.012	0.014	0.010	0.008	0.022	0.040	--	0.013	0.008	0.010	0.006	0.013
SO_2	0.042	0.038	0.027	0.024	0.017	0.015	0.026	0.026	0.035	0.019	0.035	0.036	0.027
NO_2	0.038	0.046	0.036	0.028	0.024	0.020	0.044	0.029	0.035	0.050	0.057	0.084	0.043
RHC	0.11	0.09	0.05	0.20	0.25	0.49	0.53	0.47	0.29	--	0.11	0.49	0.29
CO	1.58	1.32	0.98	0.68	0.54	0.33	1.23	1.81	1.92	1.65	2.67	1.79	1.42

Table 9

Maximum Concentrations in ppm (v/v) at Different Time-Averaging Periods

	O_3			SO_2			NO_2		
	5-min	1-hr	24-hr	5-min	1-hr	24-hr	5-min	1-hr	24-hr
J	0.167	0.023	0.020	0.271	0.155	0.089	0.245	0.113	0.072
F	0.139	0.026	0.020	0.569	0.174	0.056	0.131	0.096	0.061
M	0.121	0.034	0.024	0.327	0.100	0.043	0.353	0.222	0.090
A	0.288	0.048	0.018	0.240	0.095	0.048	0.394	0.324	0.117
M	0.029	0.026	0.013	0.397	0.183	0.039	0.105	0.094	0.042
J	0.280	0.070	0.023	0.258	0.118	0.036	0.135	0.121	0.044
J	0.192	0.091	0.081	0.393	0.139	0.054	0.157	0.141	0.104
A	--	--	--	0.314	0.116	0.043	0.324	0.121	0.057
S	0.077	0.072	0.029	0.449	0.150	0.055	0.105	0.095	0.060
O	0.028	0.026	0.015	0.251	0.103	0.036	0.142	0.123	0.082
N	0.030	0.027	0.020	0.416	0.190	0.060	0.257	0.199	0.149
D	0.015	0.014	0.009	0.420	0.181	0.049	0.196	0.182	0.166

	CO				RHC			
	5-min	1-hr	8-hr	24-hr	5-min	1-hr	3-hr*	24-hr
J	16.00	14.01	10.00	5.27	3.07	2.37	0.48	0.80
F	13.11	8.39	5.03	3.22	5.51	1.19	0.30	0.29
M	4.89	4.27	2.87	1.70	10.55	1.35	0.28	0.10
A	3.36	6.63	5.35	2.00	3.93	1.83	1.73	1.66
M	9.36	6.35	3.60	1.80	15.80	1.62	1.13	0.58
J	3.41	2.87	1.53	0.74	10.30	6.45	2.58	1.15
J	5.32	4.02	2.83	1.70	18.23	5.43	3.42	0.99
A	6.24	5.51	3.46	2.58	4.72	1.43	0.87	0.63
S	9.08	6.50	3.89	2.83	6.14	1.45	0.68	0.59
O	7.54	6.41	4.56	2.98	--	--	--	--
N	13.29	10.35	6.32	4.76	4.79	1.55	0.45	0.44
D	11.73	9.66	6.30	3.90	4.14	2.29	2.05	1.15

* 6:00 - 9:00 a.m.

APPENDIX

Example of Monthly Computer Printout

An example of a monthly computer printout, in reduced form, of the June 1976 air quality data is shown. In sequence, air quality data are listed for ozone (O_3), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), total hydrocarbons (THC), methane (CH_4), non-methane hydrocarbons (RHC), carbon monoxide (CO), and, wind speed and wind direction. Also included in the computer printout is a tabular monthly wind rose. The air quality data are given in hourly averages for each hour in which data were available. The blank spaces in the printout indicate the times the particular instrument was down because of calibration or maintenance procedures; the blank spaces in the hourly averages also indicate that these values have been deleted from the calculations.

The heading for each variable lists the location of the air monitoring station, the method of measurement, and the units of measurement. Included with the hourly averages are the daily average, the monthly average, the total record count (hours), the 5-minute maximum, the hourly maximum and the hourly minimum concentration. The THC, CH_4, and RHC data also include the 6:00-9:00 a.m. and 4:00-7:00 p.m. averages; these time periods correspond to the morning and evening rush hour traffic periods. The CO data also include the 8-hour maximum concentration that occurred during a particular day, and the maximum 8-hour concentration that occurred during the month. For the meteorological conditions the daily average wind speed and prevailing wind direction are also tabulated. In the monthly tabular wind rose the speed groups, the percent of occurrence of wind direction for each wind speed group and the monthly prevailing wind direction are also included. Further details of the air quality computer program and the printout have been presented in a previous publication (4).

JUNE 1976
63 - CHEMILUMINESCENT - PPM(V/V)

LONG. 77 01' 41.5" W
LAT. 38 49' 22.5" N

UTM 324,400 METERS EASTING
4,298,700 METERS NORTHING

GROUND LEVEL TO PROBE - 60 FEET

DAY	-HOUR BEGINNING AT- 00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
1										0.005	0.005	0.006	0.014	0.011	0.015	0.017		0.009	0.008	0.005
2	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
3	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.006	0.009	0.010	0.010	0.010	0.009	0.006	0.006	0.005
4	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.007	0.009	0.011	0.011	0.013	0.012	0.011	0.008	0.005
5	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.008	0.015	0.016	0.016	0.019	0.024	0.024	0.027	0.030	0.025
6	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005		0.005	0.007	0.014	0.020	0.016	0.016	0.012	0.014	0.015	0.013	0.011
7	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.015	0.021	0.021	0.023	0.026	0.026	0.027	0.024	0.024	0.020
8	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.010	0.017	0.024	0.035	0.036	0.025	0.024	0.024	0.019
9	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.010	0.024	0.035	0.045	0.026	0.020	0.022	0.032	0.023	0.013
10	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.009	0.021	0.025	0.039	0.040	0.041	0.041	0.038	0.039	0.038	0.035
11	0.021	0.021	0.018	0.020	0.019	0.016	0.011	0.005	0.005	0.013	0.038	0.042	0.043	0.044	0.042	0.041	0.034		0.034	0.026
12	0.013	0.007	0.005	0.005	0.005	0.005	0.005	0.007	0.020	0.032	0.035	0.041	0.038	0.043	0.042	0.040	0.035	0.029	0.029	0.022
13	0.015	0.014	0.014	0.012	0.012	0.013	0.013	0.012	0.013	0.013	0.014	0.015	0.016	0.015	0.015	0.013	0.012	0.011	0.009	0.009
14	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.007	0.007	0.008	0.010	0.013	0.017	0.016	0.017	0.018	0.017	0.017	0.016
15	0.013	0.014	0.014	0.014	0.012	0.010	0.008	0.005	0.007	0.010	0.014	0.021	0.026	0.016	0.014	0.015	0.012		0.009	0.007
16	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.070	0.006	0.005	0.005	0.005	0.005	0.006	0.006	0.005	0.006	0.006	0.006
17	0.005	0.005	0.005	0.005	0.006	0.006	0.005	0.007	0.006	0.007	0.010	0.009	0.013	0.015	0.017	0.016	0.013	0.013	0.013	0.008
18	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.004	0.009	0.010	0.011	0.013	0.016	0.019	0.016	0.008	0.007
19	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.007	0.013	0.017	0.015	0.012	0.006	0.005	0.005
20	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.006	0.007	0.009	0.011	0.011	0.013	0.013	0.011	0.005	0.005	0.005
21	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
22	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.006	0.010	0.012	0.012	0.012	0.013	0.014	0.013	0.008	0.008
23	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.009	0.011	0.015	0.017	0.016	0.016	0.015	0.015	0.014	0.014	0.013
24	0.008	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.007	0.010	0.013	0.014	0.012	0.013	0.014	0.014	0.014	0.014	0.011
25	0.008	0.008	0.008	0.008	0.007	0.006	0.005	0.005	0.005	0.005	0.008	0.013	0.013	0.010	0.014	0.018	0.016	0.017	0.012	0.007
26	0.005	0.005	0.005	0.005	0.005	0.006	0.006	0.005	0.005	0.005	0.009	0.021	0.029	0.032	0.033	0.034	0.034	0.034	0.033	0.029
27	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.013	0.021	0.026	0.034	0.040	0.044	0.042	0.039	0.041	0.040	0.039	0.034
28	0.005	0.012	0.009	0.005	0.006	0.005	0.005	0.005	0.006	0.017	0.035	0.053	0.052	0.050	0.051	0.042	0.046	0.035	0.027	0.024
29	0.019	0.016	0.010	0.012	0.016	0.011	0.009	0.006	0.014	0.016										
30																				
ARITH. AVER.	0.007	0.007	0.007	0.006	0.006	0.006	0.006	0.006	0.009	0.009	0.012	0.017	0.020	0.020	0.021	0.021	0.020	0.018	0.017	0.014
MAXIMUM HR.	0.021	0.021	0.018	0.020	0.019	0.016	0.013	0.012	0.070	0.032	0.038	0.053	0.052	0.050	0.051	0.042	0.046	0.040	0.039	0.035
MINIMUM HR.	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
PEAK READ	0.022	0.024	0.019	0.022	0.022	0.022	0.016	0.015	0.280	0.034	0.049	0.058	0.059	0.061	0.064	0.050	0.051	0.042	0.042	0.038

MONTHLY ARITH. AVE. 0.012 PERCENT AVAILABLE DATA 93 HOUR MAX. 0.070

HOURLY RECORD COUNT 669 PEAK MAX. 0.280 HOUR MIN. 0.005

Fig. A1 — NRL Air Monitoring Station (Continues)

DAY	HOUR BEGINNING AT- 20	21	22	23	DAILY AVER.	CNT
1	0.005	0.005	0.005	0.005	0.008	14
2	0.005	0.005	0.005	0.005	0.005	24
3	0.005	0.005	0.005	0.005	0.006	24
4	0.005	0.005	0.005	0.005	0.007	24
5	0.013	0.005	0.005	0.005	0.012	24
6	0.005	0.005	0.005	0.005	0.009	23
7	0.009	0.005	0.005	0.005	0.013	24
8	0.007	0.005	0.005	0.005	0.012	24
9	0.007	0.005	0.005	0.005	0.013	24
10	0.017	0.025	0.022	0.024	0.021	24
11	0.009	0.012	0.010	0.008	0.023	23
12	0.024	0.019	0.020	0.017	0.022	24
13	0.005	0.005	0.006	0.006	0.012	24
14	0.013	0.012	0.008	0.012	0.010	24
15	0.005	0.005	0.005	0.005	0.011	23
16	0.005	0.005	0.005	0.005	0.008	24
17	0.006	0.005	0.005	0.005	0.009	24
18	0.005	0.005	0.005	0.005	0.008	24
19	0.005	0.006	0.005	0.005	0.007	24
20	0.005	0.005	0.005	0.005	0.007	24
21	0.005	0.005	0.005	0.005	0.005	24
22	0.006	0.006	0.005	0.005	0.008	24
23	0.008	0.008	0.009	0.009	0.010	24
24	0.009	0.012	0.012	0.010	0.009	24
25	0.009	0.010	0.006	0.007	0.009	24
26	0.021	0.005	0.005	0.005	0.016	24
27	0.029	0.012	0.008	0.005	0.021	24
28	0.018	0.016	0.008	0.020	0.023	24
29					0.013	10
30						0
ARITH. AVER.	0.009	0.008	0.007	0.007		
MAXIMUM HR.	0.029	0.025	0.022	0.024		
MINIMUM HR.	0.005	0.005	0.005	0.005		
PEAK READ	0.033	0.026	0.024	0.026		

Fig. A1 — NRL Air Monitoring Station (Continues)

JUNE 1976
SO2 - FLAME PHOTOMETRIC - PPM(V/V)

LONG. 77 01' 41.5" W
LAT. 38 49' 22.5" N

UTM 324,400 METERS EASTING
4,298,700 METERS NORTHING

GROUND LEVEL TO PROBE - 60 FEET

DAY	HOUR BEGINNING AT 00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
1										0.005	0.006	0.005	0.005	0.007	0.014	0.022		0.012	0.012	0.013
2	0.005	0.006	0.008	0.010	0.021	0.009	0.006	0.010	0.011	0.010	0.010	0.020	0.024	0.024	0.014	0.005	0.005	0.005	0.005	0.006
3	0.005	0.005	0.005	0.005	0.005	0.005	0.007	0.007	0.007	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
4	0.005	0.008	0.006	0.012	0.015	0.020	0.017	0.022	0.058	0.041	0.030	0.021	0.011	0.005	0.005	0.005	0.005	0.005	0.005	0.005
5	0.005	0.007	0.014	0.013	0.010	0.013	0.012	0.011	0.013	0.015	0.015	0.013	0.006	0.006	0.009	0.012	0.009	0.009	0.007	0.006
6	0.007	0.017	0.014	0.010	0.010	0.012	0.016	0.023		0.053	0.020	0.012	0.013	0.007	0.005	0.005	0.005	0.005	0.005	0.007
7	0.030	0.017	0.019	0.008	0.008	0.009	0.010	0.012	0.014	0.019	0.028	0.026	0.024	0.018	0.018	0.017	0.022	0.019	0.018	0.029
8	0.032	0.040	0.028	0.029	0.017	0.030	0.035	0.016	0.020	0.021	0.023	0.027	0.037	0.039	0.024	0.014	0.010	0.011	0.023	0.012
9	0.032	0.030	0.031	0.051	0.043	0.040	0.035	0.032	0.040	0.041	0.033	0.037	0.041	0.018	0.010	0.012	0.012	0.022	0.013	0.013
10	0.052	0.040	0.055	0.031	0.041	0.043	0.036	0.025	0.035	0.034	0.036	0.118	0.036	0.016	0.018	0.020	0.019	0.023	0.028	0.034
11	0.031	0.022	0.038	0.032	0.017	0.014	0.016	0.021	0.036	0.045	0.048	0.044	0.034	0.033	0.040	0.074	0.076		0.019	0.027
12	0.035	0.077	0.071	0.066	0.076	0.068	0.064	0.049	0.043	0.043	0.058	0.040	0.025	0.029	0.030	0.024	0.015	0.005	0.005	0.005
13	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.007	0.005	0.005	0.005	0.005	0.005	0.005	0.005
14	0.007	0.015	0.009	0.008	0.013	0.008	0.007	0.005	0.006	0.005	0.005	0.009	0.006	0.007	0.007	0.005	0.005	0.008	0.007	0.012
15	0.005	0.005	0.010	0.015	0.008	0.005	0.005	0.008	0.007	0.012	0.010	0.007	0.010	0.017	0.014	0.014	0.016		0.012	0.013
16	0.015	0.015	0.006	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.011
17	0.005	0.005	0.005	0.005	0.009	0.016	0.010	0.005	0.005	0.010	0.010	0.005	0.005	0.005	0.008	0.007	0.005	0.005	0.005	0.005
18	0.014	0.010	0.011	0.012	0.013	0.012	0.005	0.005	0.006	0.012	0.006	0.005	0.005	0.005	0.005	0.005	0.005	0.006	0.006	0.007
19	0.020	0.020	0.011	0.023	0.018	0.011	0.012	0.012	0.007	0.005	0.005	0.010	0.020	0.037	0.040	0.022	0.008	0.005	0.005	0.005
20	0.006	0.011	0.007	0.006	0.005	0.006	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.011	0.005	0.005	0.005	0.005
21	0.005	0.005	0.009	0.006	0.005	0.007	0.006	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
22	0.006	0.012	0.016	0.017	0.014	0.009	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.006	0.008	0.005	0.006
23	0.010	0.005	0.013	0.023	0.016	0.005	0.005	0.006	0.013	0.007	0.007	0.006	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.008
24	0.010	0.020	0.024	0.013	0.015	0.015	0.008	0.008	0.007	0.012	0.011	0.007	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
25	0.007	0.006	0.005	0.005	0.005	0.005	0.005	0.005	0.006	0.007	0.005	0.005	0.031	0.090	0.043	0.009	0.025	0.008	0.013	0.026
26	0.007	0.005	0.048	0.012	0.005	0.005	0.005	0.016	0.037	0.016	0.015	0.010	0.006	0.006	0.005	0.005	0.005	0.005	0.009	0.012
27	0.042	0.032	0.025	0.034	0.030	0.020	0.032	0.024	0.016	0.019	0.039	0.027	0.025	0.021	0.015	0.009	0.008	0.016	0.011	0.019
28	0.034	0.019	0.080	0.044	0.026	0.012	0.013	0.018	0.033	0.037	0.054	0.058	0.032	0.012	0.012	0.015	0.026	0.015	0.016	0.012
29	0.011	0.006	0.017	0.019	0.006	0.017	0.015	0.007	0.005	0.008										
30																				
ARITH. AVER.	0.016	0.017	0.021	0.019	0.016	0.015	0.014	0.013	0.017	0.017	0.018	0.019	0.016	0.015	0.013	0.013	0.012	0.009	0.009	0.011
MAXIMUM HR.	0.052	0.077	0.080	0.066	0.076	0.068	0.064	0.049	0.058	0.053	0.058	0.118	0.041	0.090	0.043	0.074	0.076	0.023	0.028	0.034
MINIMUM HR.	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
PEAK READ	0.071	0.141	0.211	0.132	0.107	0.085	0.086	0.067	0.078	0.095	0.070	0.238	0.127	0.258	0.198	0.229	0.159	0.080	0.041	0.110

MONTHLY ARITH. AVE. 0.015 PERCENT AVAILABLE DATA 93 HOUR MAX. 0.118

HOURLY RECORD COUNT 669 PEAK MAX. 0.258 HOUR MIN. 0.005

Fig. A1 — NRL Air Monitoring Station (Continues)

DAY	•HELR BEGINNING AT• 20	21	22	23	DAILY AVER.	CNT
1	0.019	0.017	0.016	0.005	0.011	14
2	0.005	0.005	0.005	0.005	0.010	24
3	0.005	0.005	0.005	0.005	0.005	24
4	0.005	0.005	0.005	0.005	0.013	24
5	0.006	0.005	0.014	0.016	0.010	24
6	0.006	0.015	0.009	0.026	0.013	23
7	0.048	0.057	0.044	0.026	0.023	24
8	0.010	0.015	0.020	0.028	0.023	24
9	0.026	0.025	0.039	0.050	0.030	24
10	0.031	0.025	0.027	0.028	0.035	24
11	0.044	0.038	0.034	0.032	0.036	23
12	0.005	0.005	0.005	0.005	0.035	24
13	0.005	0.005	0.005	0.006	0.005	24
14	0.019	0.009	0.014	0.015	0.009	24
15	0.026	0.024	0.023	0.023	0.013	23
16	0.013	0.012	0.014	0.005	0.007	24
17	0.005	0.009	0.014	0.009	0.007	24
18	0.011	0.012	0.018	0.013	0.009	24
19	0.005	0.007	0.006	0.007	0.013	24
20	0.005	0.005	0.016	0.009	0.006	24
21	0.008	0.007	0.005	0.005	0.006	24
22	0.006	0.007	0.007	0.006	0.007	24
23	0.008	0.018	0.014	0.014	0.009	24
24	0.005	0.005	0.005	0.005	0.009	24
25	0.014	0.006	0.021	0.014	0.015	24
26	0.013	0.014	0.041	0.049	0.015	24
27	0.011	0.020	0.023	0.043	0.023	24
28	0.014	0.011	0.024	0.009	0.026	24
29					0.011	10
30						0
ARITH. AVER.	0.014	0.014	0.017	0.017		
MAXIMUM HR.	0.048	0.057	0.044	0.050		
MINIMUM HR.	0.005	0.005	0.005	0.005		
PEAK READ	0.088	0.101	0.091	0.070		

Fig. A1 — NRL Air Monitoring Station (Continues)

JUNE 1976
NO2 - COLORIMETRIC - PPM(V/V)

LONG. 77 01′ 41″ W
LAT. 38 49′ 22″ N

UTM 324,400 METERS EASTING
4,298,700 METERS NORTHING

GROUND LEVEL TO PROBE - 60 FEET

DAY	HOUR BEGINNING AT: 00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
1										0.025	0.019	0.022	0.009	0.006	0.008	0.007		0.012	0.012	0.012
2	0.020	0.041	0.036	0.036	0.043	0.035	0.012	0.021	0.025	0.022	0.021	0.020	0.023	0.028	0.027	0.019	0.015	0.017	0.020	0.025
3	0.017	0.007	0.005	0.002	0.002	0.007	0.021	0.031	0.027	0.013	0.007	0.006	0.007	0.006	0.006	0.007	0.007	0.005	0.010	0.027
4	0.046	0.045	0.045	0.043	0.043	0.040	0.033	0.037	0.042	0.040	0.030	0.019	0.013	0.019	0.007	0.007	0.008	0.004	0.005	0.010
5	0.048	0.051	0.047	0.047	0.045	0.043	0.040	0.045	0.037	0.024	0.018	0.013	0.007	0.005	0.008	0.008	0.006	0.007	0.011	0.018
6	0.053	0.057	0.059	0.061	0.062	0.062	0.073	0.069		0.065	0.037	0.016	0.011	0.008	0.008	0.014	0.010	0.007	0.007	0.012
7	0.068	0.057	0.054	0.036	0.025	0.017	0.023	0.043	0.040	0.045	0.026	0.009	0.007	0.007	0.006	0.003	0.005	0.008	0.011	0.018
8	0.062	0.041	0.043	0.037	0.030	0.029	0.039	0.056	0.070	0.080	0.061	0.036	0.032	0.022	0.013	0.010	0.008	0.009	0.009	0.010
9	0.082	0.071	0.067	0.064	0.056	0.059	0.039	0.049	0.049	0.059	0.064	0.047	0.023	0.011	0.008	0.007	0.007	0.016	0.010	0.017
10	0.074	0.053	0.042	0.044	0.029	0.045	0.061	0.063	0.064	0.111	0.121	0.101	0.031	0.013	0.010	0.009	0.012	0.007	0.008	0.009
11	0.011	0.009	0.009	0.008	0.004	0.007	0.016	0.035	0.062	0.069	0.018	0.007	0.007	0.007	0.007	0.022	0.031		0.013	0.025
12	0.036	0.046	0.054	0.049	0.038	0.033	0.028	0.026	0.009	0.003	0.003	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.003	0.005
13	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.005	0.002
14	0.007	0.008	0.007	0.006	0.004	0.009	0.029	0.005	0.017	0.018	0.015	0.015	0.013	0.013	0.008	0.008	0.009	0.004	0.006	0.008
15	0.005	0.006	0.006	0.005	0.005	0.007	0.011	0.020	0.019	0.010	0.012	0.007	0.002	0.004	0.006	0.003	0.004		0.004	0.008
16	0.006	0.004	0.004	0.003	0.004	0.004	0.006	0.006	0.009	0.004	0.007	0.007	0.006	0.005	0.003	0.005	0.006	0.003	0.008	0.006
17	0.002	0.003	0.005	0.007	0.009	0.012	0.019	0.013	0.016	0.014	0.016	0.015	0.005	0.007	0.006	0.004	0.004	0.003	0.004	0.015
18	0.027	0.023	0.023	0.020	0.018	0.019	0.020	0.014	0.012	0.011	0.008	0.005	0.003	0.003	0.005	0.004	0.006	0.009	0.016	0.014
19	0.020	0.021	0.012	0.016	0.014	0.011	0.011	0.012	0.009	0.009	0.003	0.005	0.005	0.003	0.003	0.009	0.007	0.007	0.008	0.012
20	0.006	0.012	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.006	0.005	0.012	0.015	0.013
21	0.004	0.002	0.004	0.003	0.004	0.009	0.011	0.011	0.008	0.015	0.011	0.013	0.014	0.013	0.010	0.003	0.008	0.007	0.004	0.006
22	0.009	0.017	0.017	0.016	0.019	0.018	0.014	0.013	0.007	0.004	0.003	0.003	0.002	0.003	0.004	0.006	0.005	0.006	0.004	0.005
23	0.017	0.012	0.012	0.014	0.013	0.004	0.007	0.015	0.017	0.014	0.006	0.003	0.003	0.011	0.004	0.002	0.002	0.004	0.002	0.003
24	0.006	0.017	0.017	0.011	0.016	0.018	0.021	0.019	0.009	0.009	0.009	0.006	0.003	0.004	0.002	0.004	0.004	0.004	0.005	0.003
25	0.004	0.003	0.002	0.002	0.002	0.002	0.003	0.004	0.004	0.006	0.004	0.004	0.008	0.018	0.010	0.002	0.010	0.004	0.010	0.018
26	0.010	0.014	0.021	0.012	0.008	0.003	0.004	0.013	0.023	0.017	0.016	0.010	0.005	0.004	0.003	0.002	0.002	0.002	0.002	0.007
27	0.080	0.068	0.063	0.059	0.052	0.052	0.047	0.037	0.025	0.011	0.008	0.005	0.007	0.005	0.004	0.003	0.004	0.006	0.003	0.008
28	0.058	0.036	0.040	0.047	0.037	0.035	0.047	0.051	0.065	0.072	0.068	0.040	0.024	0.008	0.008	0.008	0.010	0.009	0.010	0.009
29	0.007	0.008	0.017	0.013	0.006	0.013	0.021	0.025	0.018	0.011										
30																				
ARITH. AVER.	0.028	0.026	0.026	0.024	0.022	0.021	0.024	0.026	0.026	0.027	0.022	0.016	0.010	0.009	0.007	0.007	0.007	0.007	0.008	0.012
MAXIMUM HR.	0.082	0.071	0.067	0.064	0.062	0.062	0.073	0.069	0.084	0.111	0.121	0.101	0.032	0.028	0.027	0.022	0.031	0.017	0.020	0.027
MINIMUM HR.	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
PEAK READ	0.088	0.076	0.073	0.068	0.069	0.075	0.105	0.072	0.096	0.122	0.135	0.124	0.078	0.050	0.034	0.048	0.070	0.022	0.027	0.034

MONTHLY ARITH. AVE. 0.020 PERCENT AVAILABLE DATA 93 HOUR MAX. 0.121

HOURLY RECORD COUNT 669 PEAK MAX. 0.135 HOUR MIN. 0.002

Fig. A1 — NRL Air Monitoring Station (Continues)

DAY	HOUR BEGINNING AT 20	21	22	23	DAILY AVER.	CNT
1	0.015	0.016	0.013	0.011	0.013	14
2	0.017	0.019	0.020	0.022	0.024	24
3	0.028	0.045	0.047	0.046	0.016	24
4	0.018	0.039	0.045	0.047	0.028	24
5	0.024	0.029	0.047	0.047	0.028	24
6	0.060	0.075	0.063	0.068	0.042	23
7	0.041	0.065	0.072	0.056	0.032	24
8	0.049	0.084	0.089	0.088	0.043	24
9	0.047	0.046	0.079	0.079	0.044	24
10	0.043	0.028	0.018	0.012	0.043	24
11	0.056	0.041	0.038	0.041	0.024	23
12	0.003	0.002	0.002	0.002	0.015	24
13	0.005	0.004	0.004	0.007	0.003	24
14	0.011	0.011	0.017	0.009	0.011	24
15	0.011	0.006	0.007	0.006	0.008	23
16	0.013	0.020	0.007	0.004	0.006	24
17	0.016	0.023	0.036	0.032	0.012	24
18	0.016	0.027	0.024	0.023	0.015	24
19	0.013	0.008	0.015	0.017	0.010	24
20	0.009	0.010	0.015	0.010	0.006	24
21	0.014	0.017	0.014	0.010	0.009	24
22	0.016	0.013	0.019	0.020	0.010	24
23	0.023	0.030	0.026	0.016	0.011	24
24	0.003	0.005	0.004	0.004	0.008	24
25	0.017	0.010	0.020	0.008	0.007	24
26	0.023	0.069	0.085	0.084	0.018	24
27	0.014	0.045	0.049	0.053	0.030	24
28	0.018	0.021	0.038	0.006	0.032	24
29					0.014	10
30						0
ARITH. AVER.	0.022	0.030	0.033	0.030		
MAXIMUM HR.	0.060	0.085	0.089	0.088		
MINIMUM HR.	0.003	0.002	0.002	0.002		
PEAK READ	0.078	0.090	0.096	0.092		

Fig. A1 — NRL Air Monitoring Station (Continues)

JUNE 1976
THC - FLAME IONIZATION - PPM(V/V)

LONG. 77 01' 41" W
LAT. 38 49' 22" N

UTM 324,400 METERS EASTING
4,298,700 METERS NORTHING

GROUND LEVEL TO PROBE - 40 FEET

DAY	HOUR BEGINNING AT: 00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
1														0.91	1.06	0.97		2.09	1.60	0.98
2	0.95	1.08	1.08	1.10	2.35	1.80	1.07	0.96	0.98	0.93	0.86	0.82	0.90	0.91	0.86	0.81	0.80	0.78	0.81	0.85
3	0.76	0.68	0.68	0.61	0.55								0.94	0.95	0.93	0.93	0.92	0.93	0.92	0.97
4	1.33	1.50	1.51	1.43	1.35	1.65	1.47	1.57	1.54	1.38	1.34	1.13	0.92		0.99	0.99	0.98	0.96	0.97	0.99
5	0.89	1.48	1.59	1.87	2.06	1.89	1.74	1.74	1.43	1.16	1.12	1.10	0.82	1.08	1.09	1.08	1.10	1.13	0.88	1.19
6	1.50	2.27	2.65	2.10	2.23	2.14	2.32	3.34		1.92	1.62	1.15	1.14	1.10	1.09	1.10	1.09	1.03	1.00	1.01
7	4.09	3.42	1.73	1.50	1.71	1.92	2.14	1.63	1.63	1.46			1.07	1.03	1.04	1.06	0.94	1.06	1.09	1.19
8	3.39	3.18	2.41	2.58	2.19	1.22	1.22	1.35	1.48	1.58	1.45	1.14	1.14	1.16	1.16	1.10	1.05	0.94	1.06	1.06
9	6.70	7.15	4.46	2.84	2.37	2.39	1.31	1.26	1.21	1.19	1.31	1.32	1.11	1.11	0.98	0.94	0.94	1.11	1.04	0.93
10	2.68	2.86	2.17	2.10	2.08	3.63	2.57	2.42	2.38	2.02	1.80	1.51	1.41	1.57	1.12	0.91	1.11	0.96	0.94	1.02
11	1.18	2.89	1.95	2.06	1.64	1.08	1.31	1.30	1.38	1.29	0.96	0.91				0.98	0.93		0.93	1.10
12	1.34	2.04	4.10	5.63	4.23	3.82	3.74	2.97	1.17	1.03	1.02	1.03	0.67	1.04	1.03	1.03	1.05	0.99	1.05	1.00
13	0.86	0.85	0.82	0.87	0.88	0.89	0.86	0.78	0.97	0.99	0.98	1.04	0.99	1.03	1.02	1.01	1.06	1.08	1.00	0.66
14	1.14	0.91	1.04	0.75	0.25	0.25	0.25	0.25												
15																				
16																				
17																				
18								1.65	1.60	1.34	1.44	1.51	2.54	2.11	2.21	1.86	3.13	2.18	1.35	2.18
19	1.96	1.76	1.53	2.12	1.76	1.38	1.93	1.76	1.49	1.35	1.19	1.24	1.54	2.14	1.77	1.23	1.51	1.35	1.31	1.44
20	2.48	2.17	1.43	2.52	2.61	1.96	2.73	3.37	3.11	2.74	2.48	1.69	1.53	1.80	2.19	1.20	1.20	1.27	1.37	1.19
21	1.09	1.09	1.25	1.15	1.17	1.42	1.43	1.61	1.48	1.32	1.23	1.21	1.36	1.30	1.14	1.11	1.09	1.17	1.42	1.16
22	1.24	1.57	1.53	1.56	1.72	1.78	1.27	1.81	2.89	1.24	1.38	1.59	1.29	1.77	1.81	2.10	2.46	1.27	1.10	1.12
23	1.60	1.23	1.46	1.61	1.56	2.74	1.91	1.23	1.46	1.27	1.22	1.42	1.35	1.63	1.62	1.59	1.54	1.90	1.13	1.27
24	2.36	2.04	1.83	1.72	1.52	1.55	1.40	1.69	1.21	1.38	1.50	1.91	2.10	2.14	2.26	2.55	2.70	2.13	2.64	2.35
25	3.42	1.55	2.40	2.59	2.65	3.03	3.87	3.52	2.68	1.63	1.39	1.32	1.35	1.41	1.39	1.18	1.20	2.16	2.78	1.69
26	2.16	1.41	1.35	1.09	1.07	1.13	1.07	1.07	1.09	1.11	1.11	1.11	1.08	1.20	1.48	1.22	1.09	1.10	1.07	1.11
27	3.46	3.08	3.41	3.30	3.06	2.08	2.50	2.70	1.74	1.25	1.17	1.10	1.13	1.09	1.10	1.12	1.11	1.10	1.09	1.08
28	3.36	2.79	2.69	3.24	2.94	1.69	2.65	1.71	1.65	1.67	1.69	1.63	1.91	1.61	1.60	1.77	2.15	2.07	1.42	2.13
29	1.80	2.27	1.88	2.98	2.66	3.31	2.17	2.46	1.82	1.16										
30																				
ARITH. AVER.	2.16	2.15	1.96	2.06	1.96	1.95	1.87	1.84	1.65	1.41	1.35	1.28	1.29	1.37	1.35	1.24	1.36	1.34	1.25	1.24
MAXIMUM HR.	6.70	7.15	4.46	5.63	4.23	3.82	3.87	3.52	3.11	2.74	2.48	1.91	2.54	2.14	2.26	2.55	3.13	2.18	2.78	2.35
MINIMUM HR.	0.76	0.68	0.68	0.61	0.25	0.25	0.25	0.25	0.97	0.93	0.86	0.62	0.67	0.91	0.86	0.81	0.80	0.78	0.81	0.66
PEAK READ	10.55	9.69	6.88	6.74	4.96	4.82	4.68	6.31	5.29	3.78	3.63	2.76	4.01	3.40	3.39	3.53	4.99	4.40	4.40	5.18

MONTHLY ARITH. AVE. 1.62 PERCENT AVAILABLE DATA 78 HOUR MAX. 7.15

HOURLY RECORD COUNT 558 PEAK MAX. 10.55 HOUR MIN. 0.25

Fig. A1 — NRL Air Monitoring Station (Continues)

DAY	HOUR BEGINNING AT: 20	21	22	23	6-9AM AVER.	4-7PM AVER.	DAILY AVER.	CNT
1	1.01	1.50	0.86	0.81		1.85	1.22	10
2	0.83	0.85	0.83	0.79	1.00	0.80	1.00	24
3	1.02	1.12	1.18	1.21		0.92	0.90	17
4	1.03	1.10	1.13	1.17	1.53	0.97	1.24	23
5	1.20	1.16	1.46	1.77	1.64	1.04	1.34	24
6	1.27	1.86	1.69	3.51	2.83	1.04	1.74	23
7	1.67	3.76	2.71	3.18	1.80	1.03	1.87	22
8	1.21	1.81	2.43	3.60	1.35	1.01	1.70	24
9	1.45	1.36	1.58	1.87	1.27	1.03	2.00	24
10	1.73	1.31	1.12	1.04	2.46	1.01	1.77	24
11	1.16	1.27	1.18	1.02	1.33	0.93	1.33	20
12	1.01	0.59	0.97	0.95	2.63	1.03	1.83	24
13	1.03	1.02	1.01	1.13	0.87	1.04	0.95	24
14					0.25		0.60	8
15								0
16								0
17								0
18	2.13	1.51	1.98	1.52	1.63	2.22	1.90	17
19	1.42	1.39	1.50	1.58	1.73	1.39	1.57	24
20	1.29	1.46	1.55	1.19	3.07	1.28	1.94	24
21	1.29	1.39	1.39	1.25	1.51	1.23	1.27	24
22	1.22	1.22	1.31	1.38	1.99	1.61	1.57	24
23	1.40	1.68	1.86	2.55	1.53	1.52	1.60	24
24	3.17	3.00	3.12	3.84	1.43	2.49	2.17	24
25	1.51	1.11	2.31	3.05	3.36	2.05	2.16	24
26	1.20	1.49	2.26	4.12	1.08	1.09	1.38	24
27	1.16	3.25	2.77	3.88	2.32	1.10	2.03	24
28	1.52	1.48	1.94	2.25	2.00	1.88	2.06	24
29					2.15		2.27	10
30								0
ARITH. AVER.	1.37	1.60	1.67	2.03				
MAXIMUM HR.	3.17	3.76	3.12	4.12				
MINIMUM HR.	0.83	0.85	0.83	0.79				
PEAK READ	5.32	5.05	4.37	6.10				

Fig. A1 — NRL Air Monitoring Station (Continues)

JUNE 1976
CH4 - FLAME IONIZATION - PPM(V/V)

LONG. 77 01' 41.5" W
LAT. 38 49' 22.5" N

UTM 324,400 METERS EASTING
4,298,700 METERS NORTHING

GROUND LEVEL TO PROBE - 40 FEET

DAY	HOUR BEGINNING AT: 00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
1														0.67	0.78	0.72		1.95	1.40	0.72
2	0.70	0.75	0.76	0.77	2.21	1.57	0.92	0.74	0.65	0.65	0.61	0.58	0.63	0.61	0.60	0.57	0.56	0.54	0.56	0.57
3	0.60	0.61	0.67	0.67	0.69								0.77	0.77	0.76	0.75	0.76	0.76	0.74	0.75
4	1.90	1.06	1.12	1.09	1.08	1.32	1.11	1.10	1.06	0.99	0.97	0.89	0.84		0.80	0.82	0.83	0.81	0.81	0.80
5	0.96	1.06	1.11	1.26	1.33	1.09	0.82	0.97	1.16	0.98	0.92	0.93	0.89	0.81	0.59	0.89	0.93	0.94	0.97	0.96
6	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.72	0.89	0.89
7	3.81	3.29	1.96	0.99	0.58	0.31	0.25	0.25	0.25	0.25			0.98	0.90	0.89	0.90	0.90	0.60	0.25	0.25
8	0.25	0.25	0.75	2.56	2.21	0.48	0.25	0.29	0.29	0.25	0.64	0.86	0.88	0.89	0.88	0.87	0.83	0.83	0.38	0.25
9	0.25	1.91	4.09	2.39	0.54	0.25	0.26	0.25	0.65	0.81	0.86	0.89	0.79	0.89	0.68	0.72	0.74	0.97	0.80	0.70
10	2.03	1.75	0.69	0.56	0.31	0.65	0.55	0.27	1.66	1.28	1.05	0.92	1.06	1.22	0.80	0.69	0.93	0.79	0.79	0.80
11	0.97	2.69	1.98	1.88	1.46	0.88	1.03	0.98	0.89	0.84	0.75	0.73				0.82	0.77		0.70	0.80
12	0.91	1.61	2.93	2.60	1.09	0.42	0.25	0.52	0.88	0.82	0.79	0.77	0.75	0.74	0.33	0.25	0.25	0.25	0.25	0.25
13	0.68	0.67	0.65	0.68	0.70	0.70	0.68	0.72	0.72	0.69	0.46	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.35
14	0.99	0.77	1.00	0.64	0.31	0.26	0.25	0.25												
15																				
16																				
17																				
18								1.67	1.45	1.13	1.14	1.39	2.25	1.79	2.28	1.92	2.48	1.94	1.13	1.92
19	1.70	1.52	1.33	1.67	1.65	1.17	1.74	1.57	1.30	1.14	0.97	1.05	1.32	1.69	1.64	1.01	1.23	1.15	1.15	1.20
20	1.94	2.35	1.30	2.44	2.64	1.95	2.48	2.85	3.34	3.05	2.65	1.49	1.32	1.79	2.43	0.97	1.25	1.09	1.13	0.99
21	0.90	0.92	1.10	1.03	0.97	1.33	1.21	1.42	1.32	1.09	1.05	0.98	1.14	1.14	0.95	0.86	0.88	0.96	1.20	0.95
22	0.98	1.34	1.39	1.31	1.60	1.70	1.19	1.57	2.79	1.22	1.09	1.46	1.12	1.32	1.56	2.17	2.12	1.09	0.91	0.93
23	1.36	1.02	1.23	1.68	1.36	2.80	1.75	0.93	1.08	1.00	1.01	1.29	1.17	1.38	2.00	1.85	1.26	1.82	1.01	0.98
24	2.15	1.90	1.60	1.63	1.34	1.40	1.24	1.57	0.92	1.04	1.14	1.92	2.13	2.38	2.38	2.22	2.57	2.12	2.47	2.38
25	3.13	1.54	1.61	2.01	2.31	2.61	3.32	3.24	2.20	1.28	1.09	0.99	1.05	1.25	1.16	0.95	0.86	2.09	2.68	1.38
26	2.43	1.19	1.08	0.65	0.84	0.89	0.84	0.82	0.85	0.66	0.86	0.85	0.85	1.01	1.29	1.04	0.85	0.85	0.82	0.83
27	2.89	2.59	2.98	2.80	2.80	1.56	2.15	2.43	1.59	1.01	0.94	0.88	0.89	0.86	0.87	0.90	0.88	0.87	0.85	0.84
28	2.96	2.65	2.18	3.71	2.90	1.43	2.30	1.27	1.08	1.10	1.10	1.12	1.57	1.32	1.22	1.51	1.82	1.55	1.18	1.73
29	1.51	1.86	1.35	2.37	2.74	2.61	1.90	2.51	1.68	0.87										
30																				
ARITH. AVER.	1.47	1.48	1.46	1.58	1.41	1.20	1.16	1.19	1.27	0.99	0.97	0.95	1.04	1.08	1.10	1.00	1.05	1.08	0.97	0.93
MAXIMUM HR.	3.81	3.29	4.09	3.71	2.90	2.80	3.32	3.24	3.38	3.05	2.65	1.92	2.25	2.38	2.43	2.22	2.57	2.12	2.68	2.38
MINIMUM HR.	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.29	0.25	0.25	0.25	0.25	0.25
PEAK READ	6.80	6.59	5.45	6.32	4.25	4.14	3.87	4.86	4.65	4.25	4.24	3.50	4.20	4.30	4.32	5.85	4.32	4.81	4.18	4.91

MONTHLY ARITH. AVE. 1.18 PERCENT AVAILABLE DATA 78 HOUR MAX. 4.09

HOURLY RECORD COUNT 558 PEAK MAX. 7.01 HOUR MIN. 0.25

Fig. A1 — NRL Air Monitoring Station (Continues)

DAY	HOUR BEGINNING AT- 20	21	22	23	6-9AM AVER.	4-7PM AVER.	DAILY AVER.	CNT
1	0.76	1.60	0.66	0.63		1.67	0.99	10
2	0.57	0.59	0.57	0.59	0.77	0.55	0.74	24
3	0.77	0.82	0.84	0.64		0.75	0.74	17
4	0.82	0.85	0.85	0.88	1.09	0.82	0.95	23
5	0.58	0.26	0.25	0.25	0.98	0.94	0.87	24
6	0.99	1.53	1.47	3.22	0.25	0.62	0.60	23
7	0.29	0.25	0.25	0.25	0.25	0.59	0.85	22
8	0.25	0.28	0.25	0.25	0.28	0.68	0.66	24
9	1.04	1.18	1.55	1.41	0.39	0.83	1.02	24
10	1.33	0.97	0.88	0.87	0.83	0.84	0.95	24
11	0.77	0.86	0.81	0.92	0.97	0.73	1.08	20
12	0.25	0.25	0.25	0.34	0.55	0.25	0.74	24
13	0.87	0.89	0.83	0.98	0.71	0.25	0.55	24
14					0.25		0.56	8
15								0
16								0
17								0
18	1.78	1.36	1.74	1.28	1.96	1.85	1.69	17
19	1.22	1.21	1.34	1.39	1.94	1.18	1.36	24
20	1.15	1.24	1.41	0.99	2.90	1.16	1.64	24
21	1.06	1.19	1.22	1.06	1.32	1.01	1.08	24
22	1.00	1.02	1.07	1.11	1.85	1.37	1.38	24
23	1.12	1.43	1.58	2.56	1.25	1.36	1.44	24
24	3.06	3.14	2.98	3.69	1.24	2.39	2.06	24
25	1.37	0.82	2.10	3.02	2.92	1.87	1.83	24
26	0.87	0.96	1.53	3.28	0.83	0.84	1.11	24
27	0.87	2.59	2.24	3.43	2.06	0.87	1.70	24
28	1.29	1.10	1.57	2.07	1.55	1.52	1.74	24
29					2.03		1.94	10
30								0
ARITH. AVER.	1.00	1.10	1.18	1.47				
MAXIMUM HR.	3.06	3.14	2.98	3.69				
MINIMUM HR.	0.25	0.25	0.25	0.25				
PEAK READ	4.78	7.01	5.20	5.35				

Fig. A1 — NRL Air Monitoring Station (Continues)

JUNE 1976
RMC - FLAME IONIZATION - PPM(V/V)

LONG. 77 01′ 41″ W
LAT. 38 49′ 22″ N

UTM 324,400 METERS EASTING
4,298,700 METERS NORTHING

GROUND LEVEL TO PROBE = 60 FEET

	HOUR BEGINNING AT:																			
DAY	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
1														0.23	0.28	0.25		0.18	0.21	0.25
2	0.25	0.32	0.32	0.33	0.17	0.26	0.15	0.22	0.32	0.28	0.24	0.24	0.28	0.29	0.26	0.24	0.25	0.24	0.25	0.28
3	0.16	0.07	0.02	0.00	0.00								0.17	0.18	0.18	0.18	0.16	0.18	0.18	0.23
4	0.43	0.44	0.40	0.34	0.26	0.33	0.36	0.47	0.48	0.39	0.36	0.24	0.09		0.18	0.16	0.16	0.16	0.15	0.19
5	0.12	0.44	0.48	0.62	0.73	0.79	0.62	0.77	0.28	0.20	0.20	0.16	0.08	0.27	0.50	0.18	0.17	0.19	0.11	0.24
6	1.25	2.02	2.40	1.85	1.98	1.89	2.07	3.09		1.67	1.37	0.90	0.89	0.85	0.84	0.85	0.84	0.31	0.11	0.12
7	0.29	0.18	0.12	0.50	1.13	1.62	1.89	1.38	1.38	1.21			0.09	0.13	0.15	0.17	0.10	0.45	0.84	0.94
8	3.14	2.93	1.66	0.11	0.08	0.73	0.97	1.06	1.18	1.33	0.81	0.28	0.26	0.28	0.28	0.23	0.22	0.16	0.67	0.81
9	6.45	5.24	0.38	0.47	1.82	2.14	1.05	1.03	0.56	0.38	0.45	0.43	0.32	0.31	0.30	0.22	0.20	0.19	0.25	0.23
10	0.65	1.11	1.48	1.54	1.77	2.98	2.02	2.15	0.72	0.74	0.74	0.58	0.36	0.36	0.33	0.22	0.18	0.17	0.16	0.22
11	0.21	0.24	0.09	0.26	0.28	0.20	0.28	0.32	0.49	0.45	0.21	0.18				0.16	0.17		0.24	0.30
12	0.43	0.44	1.17	3.03	3.14	3.41	3.49	2.45	0.29	0.21	0.22	0.26	0.07	0.30	0.69	0.78	0.80	0.74	0.80	0.75
13	0.18	0.18	0.17	0.19	0.18	0.18	0.18	0.13	0.25	0.30	0.52	0.79	0.74	0.78	0.77	0.76	0.81	0.83	0.75	0.31
14	0.15	0.15	0.12	0.15	0.00	0.00	0.00	0.00												
15																				
16																				
17																				
18								0.10	0.15	0.20	0.30	0.28	0.56	0.46	0.23	0.26	0.77	0.54	0.22	0.38
19	0.26	0.25	0.21	0.26	0.17	0.21	0.25	0.20	0.20	0.23	0.22	0.19	0.31	0.59	0.34	0.22	0.28	0.21	0.16	0.24
20	0.73	0.14	0.14	0.34	0.34	0.23	0.38	0.64	0.17	0.13	0.28	0.29	0.30	0.28	0.19	0.23	0.15	0.18	0.25	0.21
21	0.20	0.17	0.15	0.13	0.20	0.11	0.23	0.20	0.19	0.23	0.18	0.22	0.22	0.17	0.20	0.22	0.21	0.21	0.25	0.21
22	0.26	0.23	0.16	0.25	0.15	0.14	0.12	0.39	0.41	0.15	0.31	0.21	0.21	0.47	0.31	0.26	0.40	0.19	0.19	0.19
23	0.24	0.22	0.23	0.14	0.20	0.39	0.42	0.30	0.40	0.26	0.21	0.19	0.19	0.27	0.11	0.19	0.42	0.22	0.19	0.29
24	0.25	0.16	0.24	0.09	0.19	0.21	0.18	0.22	0.29	0.36	0.41	0.28	0.23	0.16	0.16	0.53	0.45	0.34	0.55	0.25
25	0.45	0.42	0.82	0.67	0.66	0.48	0.64	0.41	0.58	0.36	0.32	0.33	0.32	0.24	0.25	0.25	0.35	0.22	0.41	0.32
26	0.26	0.24	0.27	0.24	0.23	0.23	0.23	0.25	0.25	0.25	0.25	0.26	0.23	0.19	0.21	0.20	0.24	0.24	0.25	0.28
27	0.64	0.49	0.68	0.50	0.29	0.53	0.35	0.28	0.21	0.24	0.23	0.21	0.24	0.23	0.24	0.21	0.23	0.23	0.24	0.25
28	0.58	0.53	0.53	0.14	0.10	0.27	0.36	0.44	0.57	0.57	0.59	0.51	0.38	0.29	0.39	0.32	0.52	0.56	0.28	0.42
29	0.32	0.50	0.53	0.66	0.30	0.72	0.36	0.25	0.24	0.29										
30																				
ARITH. AVER.	0.74	0.71	0.53	0.53	0.60	0.78	0.73	0.70	0.44	0.45	0.40	0.34	0.30	0.33	0.32	0.30	0.35	0.30	0.32	0.33
MAXIMUM HR.	6.45	5.24	2.40	3.03	3.14	3.41	3.49	3.09	1.38	1.67	1.37	0.90	0.89	0.85	0.84	0.85	0.84	0.83	0.84	0.94
MINIMUM HR.	0.12	0.07	0.02	0.00	0.00	0.00	0.00	0.00	0.15	0.13	0.18	0.19	0.07	0.13	0.11	0.16	0.10	0.16	0.11	0.12
PEAK READ	10.30	9.44	3.43	3.82	3.71	4.83	4.15	5.91	3.93	1.86	1.71	1.42	2.37	1.73	1.87	1.42	3.32	2.11	2.59	1.81

MONTHLY ARITH. AVE. 0.49 PERCENT AVAILABLE DATA 78 HOUR MAX. 6.45

HOURLY RECORD COUNT 558 PEAK MAX. 10.30 HOUR MIN. 0.00

Fig. A1 — NRL Air Monitoring Station (Continues)

DAY	HOUR BEGINNING AT 20	21	22	23	6-9AM AVER.	4-7PM AVER.	DAILY AVER.	CNT
1	0.25	0.31	0.20	0.18		0.19	0.23	10
2	0.26	0.26	0.25	0.21	0.23	0.25	0.26	24
3	0.25	0.30	0.35	0.37		0.17	0.17	17
4	0.21	0.25	0.28	0.29	0.43	0.16	0.29	23
5	0.62	0.90	1.21	1.51	0.66	0.16	0.49	24
6	0.29	0.33	0.22	0.32	2.58	0.42	1.15	23
7	1.38	3.51	2.46	2.93	1.55	0.47	1.04	22
8	0.96	1.53	2.18	3.35	1.07	0.35	1.05	24
9	0.41	0.21	0.21	0.47	0.88	0.21	0.99	24
10	0.40	0.34	0.23	0.17	1.63	0.17	0.82	24
11	0.39	0.41	0.37	0.22	0.56	0.20	0.27	20
12	0.76	0.74	0.72	0.61	2.08	0.78	1.10	24
13	0.17	0.14	0.18	0.15	0.18	0.79	0.40	24
14					0.00		0.07	8
15								0
16								0
17								0
18	0.38	0.16	0.24	0.23	0.13	0.51	0.32	17
19	0.20	0.20	0.15	0.19	0.22	0.22	0.24	24
20	0.15	0.22	0.14	0.19	0.40	0.19	0.26	24
21	0.24	0.20	0.17	0.19	0.21	0.23	0.20	24
22	0.22	0.21	0.25	0.27	0.30	0.26	0.25	24
23	0.28	0.26	0.29	0.18	0.37	0.28	0.25	24
24	0.43	0.29	0.26	0.47	0.23	0.45	0.29	24
25	0.25	0.28	0.46	0.31	0.55	0.33	0.41	24
26	0.34	0.53	0.73	0.89	0.24	0.25	0.30	24
27	0.28	0.93	0.70	0.47	0.28	0.23	0.37	24
28	0.31	0.37	0.36	0.37	0.45	0.46	0.41	24
29					0.28		0.42	10
30								0
ARITH. AVER.	0.39	0.54	0.53	0.61				
MAXIMUM HR.	1.38	3.51	2.46	3.35				
MINIMUM HR.	0.15	0.14	0.14	0.15				
PEAK READ	2.14	4.20	3.79	3.82				

Fig. A1 — NRL Air Monitoring Station (Continues)

JUNE 1976
CB - FLAME IONIZATION - PPM(V/V)

LONG. 77 01# 41## W
LAT. 38 49# 22## N

UTM 324,40C METERS EASTING
4,298,70C METERS NORTHING

GROUND LEVEL TO PROBE - 60 FEET

DAY	HOUR BEGINNING AT 00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
1														0.25	0.25	0.25		0.25	0.25	0.25
2	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
3	0.25	0.25	0.25	0.25	0.25								0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
4	0.60	0.49	0.26	0.25	0.25	0.25	0.33	0.95	0.67	0.29	0.25	0.25	0.25		0.25	0.25	0.25	0.25	0.25	0.25
5	0.53	1.23	0.67	0.88	1.06	0.59	0.25	0.38	0.29	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
6	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25		0.28	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
7	1.33	0.83	0.29	0.25	0.25	0.25	0.25	0.25	0.25	0.25			0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
8	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.28	0.31	0.25	0.39	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
9	0.25	0.46	0.91	0.32	0.25	0.25	0.25	0.25	0.27	0.39	0.63	0.43	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
10	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1.19	1.75	1.75	0.74	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
11	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.30	0.74	0.85	0.25	0.25				0.25	0.25		0.25	0.25
12	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
13	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
14	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25												
15																				
16																				
17																				
18								0.29	0.32	0.26	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.28
19	0.48	0.39	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
20	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
21	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.27	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
22	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.26	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
23	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.37	0.58	0.28	0.25	0.25	0.26	0.26	0.25	0.25	0.25	0.25	0.25	0.25
24	0.25	0.25	0.25	0.25	0.25	0.25	0.26	0.29	0.26	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.34	0.44	0.45	0.31	0.25	0.25	0.25	0.25	0.25	0.26	0.25	0.25	0.28
26	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.26	0.26	0.32	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.27
27	2.87	2.12	2.22	1.67	1.12	0.75	0.90	0.56	0.44	0.29	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
28	0.67	0.30	0.25	0.25	0.25	0.25	0.77	1.16	1.51	1.90	1.80	1.41	0.66	0.28	0.26	0.25	0.26	0.25	0.25	0.25
29	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.38	0.33	0.25										
30																				
ARITH. AVER.	0.46	0.42	0.38	0.34	0.32	0.29	0.31	0.36	0.44	0.43	0.42	0.34	0.27	0.25	0.25	0.25	0.25	0.25	0.25	0.25
MAXIMUM HR.	2.87	2.12	2.22	1.67	1.12	0.75	0.90	1.16	1.51	1.90	1.80	1.41	0.66	0.28	0.26	0.25	0.26	0.25	0.25	0.28
MINIMUM HR.	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
PEAK READ	3.41	2.50	2.62	2.03	1.55	0.94	2.27	2.70	1.81	2.45	2.04	1.74	1.00	0.36	0.34	0.25	0.35	0.25	0.27	0.45

MONTHLY ARITH. AVE. 0.33 PERCENT AVAILABLE DATA 75 HOUR MAX. 2.87

HOURLY RECORD COUNT 558 PEAK MAX. 3.41 HOUR MIN. 0.25

8-HR. MAX. READ 1.53

Fig. A1 — NRL Air Monitoring Station (Continues)

DAY	HOUR BEGINNING AT 20	21	22	23	MAX 8-HR.	DAILY AVER.	CNT
1	0.25	0.25	0.25	0.25	0.25	0.25	10
2	0.25	0.25	0.25	0.25	0.25	0.25	24
3	0.25	0.25	0.26	0.39	0.27	0.26	17
4	0.25	0.25	0.25	0.25	0.43	0.33	23
5	0.25	0.25	0.25	0.25	0.70	0.40	24
6	0.65	0.70	0.30	1.24	0.49	0.33	23
7	0.25	0.25	0.25	0.25	0.46	0.33	22
8	0.25	0.25	0.25	0.25	0.28	0.26	24
9	0.25	0.25	0.25	0.25	0.37	0.32	24
10	0.25	0.25	0.25	0.25	0.80	0.43	24
11	0.26	0.25	0.25	0.26	0.48	0.31	20
12	0.25	0.25	0.25	0.25	0.25	0.25	24
13	0.25	0.25	0.25	0.25	0.25	0.25	24
14					0.25	0.25	8
15							0
16							0
17							0
18	0.25	0.30	0.28	0.42	0.31	0.27	17
19	0.25	0.25	0.25	0.25	0.30	0.27	24
20	0.25	0.25	0.25	0.25	0.29	0.25	24
21	0.25	0.25	0.25	0.25	0.29	0.25	24
22	0.25	0.25	0.25	0.25	0.25	0.25	24
23	0.25	0.25	0.25	0.25	0.31	0.27	24
24	0.25	0.25	0.25	0.25	0.26	0.25	24
25	0.32	0.25	0.27	0.25	0.32	0.28	24
26	0.44	1.26	1.97	2.78	0.93	0.48	24
27	0.29	0.72	0.66	0.63	1.93	0.74	24
28	0.25	0.25	0.25	0.25	1.19	0.58	24
29					0.32	0.27	0
30							0
ARITH. AVER.	0.28	0.33	0.34	0.43			
MAXIMUM HR.	0.65	1.26	1.97	2.78			
MINIMUM HR.	0.25	0.25	0.25	0.25			
PEAK READ	1.24	1.87	2.38	3.05			

Fig. A1 — NRL Air Monitoring Station (Continues)

JUNE 1976
WIND SPEED IN MPH AND DIRECTION

LONG. 77 01′ 41″ W
LAT. 38 49′ 22″ N

UTM 324,400 METERS EASTING
4,296,700 METERS NORTHING

GROUND LEVEL TO PROBE - 60 FEET

DAY	HOUR BEGINNING AT: 00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	PREV DIR.	PCT. ECC.	DAILY AVER.	CNT
1 DIRECTION										S	C	S	SSW	SSW	SSW	SSW		SW	SW	WSW	WSW	SW	NW	NNW	SSW	28		14
SPEED										2	0	3	3	4	5	4		4	7	9	7	4	7	4			4.6	
2 DIRECTION	NNE	C	C	C	C	C	NNW	N	NNE	NNE	NE	ENE	NE	ENE	ENE	E	ENE	ENE	ENE	ENE	ENE	ENE	C	C	ENE	37		24
SPEED	3	0	0	0	0	0	4	2	7	8	8	8	8	8	8	7	7	7	6	6	5	2	0	0			4.7	
3 DIRECTION	ENE	ENE	NE	ENE	NE	NE	NNE	NE	NE	ENE	E	E	ENE	E	ESE	E	ESE	SE	SE	C	C	C	C	C	C	20		24
SPEED	3	4	3	3	3	3	3	3	5	7	8	7	6	6	5	6	5	6	4	0	0	0	0	0			3.9	
4 DIRECTION	C	C	C	NNE	NNE	NNE	NNE	NNE	NE	NE	NE	ENE	E	E	E	ESE	SE	SE	SE	SSE	SE	C	C	C	C	25		24
SPEED	0	0	0	2	2	2	3	3	5	6	6	7	7	6	8	6	6	6	6	5	3	0	0	0			4.0	
5 DIRECTION	C	C	NE	NNE	C	C	C	C	NNE	NE	NE	E	ENE	E	ENE	E	ENE	E	E	F	SSE	SSE	C	C	C	33		24
SPEED	0	0	2	2	0	0	0	0	3	6	8	9	12	10	8	7	7	7	6	4	3	2	0	0			4.3	
6 DIRECTION	C	C	C	C	C	C	C	C		C	ESE	N	N	NE	NE	ENE	ENE	NE	N	C	C	C	C	C	C	60		23
SPEED	0	0	0	0	0	0	0	0		0	2	3	3	6	6	3	4	4	5	0	0	0	0	0			1.7	
7 DIRECTION	C	C	C	C	WSW	SW	SW	WSW	WSW	C	WNW	NNW	NNW	NNW	NNW	NNW	NW	W	WNW	C	WSW	C	S	S	C	29		24
SPEED	0	0	0	0	3	3	3	2	3	0	4	8	7	3	2	2	3	3	2	0	2	0	3	2			2.6	
8 DIRECTION	C	C	C	C	C	N	N	N	N	N	NNE	NNE	NNE	NE	NNE	NNE	NNE	NNE	NNE	NNE	N	C	C	C	NNE	37		24
SPEED	0	0	0	0	0	3	4	3	4	5	4	3	4	5	6	6	8	6	6	5	4	0	0	0			3.5	
9 DIRECTION	C	C	C	C	C	C	C	NNE	NNE	N	C	C	C	C	C	NNW	C	C	C	C	S	S	S	C	C	70		24
SPEED	0	0	0	0	0	0	0	3	5	4	0	0	0	0	0	3	0	0	0	0	2	2	2	0			1.5	
10 DIRECTION	C	C	C	C	C	C	C	C	C	C	C	C	C	SW	SSW	SSW	SSW	SSW	SSW	C	S	S	SSW	SSW	C	58		24
SPEED	0	0	0	0	0	0	0	0	0	0	0	0	0	3	4	4	4	3	2	0	3	4	3	3			1.7	
11 DIRECTION	C	SW	C	C	WSW	C	C	C	C	C	NW	NW	NW	NW	WNW	W	W		W	WSW	WSW	W	C	NW	C	39		23
SPEED	0	3	0	0	3	0	0	0	0	0	6	6	7	8	6	6	7		6	3	4	3	0	2			3.4	
12 DIRECTION	C	C	C	C	C	C	C	C	C	NNW	N	N	NNW	N	NNE	NNE	NNE	NE	E	E	SE	SSE	SSE	SSE	C	37		24
SPEED	0	0	0	0	0	0	0	0	0	5	4	3	5	6	4	3	6	7	7	6	7	7	6	5			3.5	
13 DIRECTION	SSE	SSE	SSE	C	SSE	SSE	SSE	SE	SSE	SSE	SSE	S	S	S	S	S	S	S	S	S	S	S	S	C	S	50		24
SPEED	4	3	2	0	2	3	3	4	5	6	4	3	5	5	5	2	4	5	4	3	4	3	4	0			3.6	
14 DIRECTION	C	C	C	W	S	S	S	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	C	C	SW	SSW	SW	SW	58		24
SPEED	0	0	0	8	10	3	4	2	7	7	6	7	7	8	7	9	9	6	6	0	0	2	2	4			5.1	
15 DIRECTION	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SSW	SSW	SSW	SSW	SSW	SSW	SSW		SSW	SW	C	C	SSW	SSW	SW	47		23
SPEED	6	6	4	5	5	5	4	4	5	5	4	5	6	5	5	4	4		4	3	0	0	2	3			4.1	
16 DIRECTION	SW	SSW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	WSW	SW	SW	SW	SW	SW	SW	SSW	S	SSW	WSW	SW	SW	75		24
SPEED	5	5	7	8	10	10	9	9	9	9	11	10	9	7	7	9	8	7	5	3	2	8	12	7			7.7	

Fig. A1 — NRL Air Monitoring Station (Continues)

PAGE TWO (2) OF WIND SPEED AND DIRECTION

DAY		HOUR BEGINNING AT- 00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	PREV DIR.	PCT. OCC.	DAILY AVER.	DAILY CNT
17	DIRECTION	SW	WSW	WSW	WSW	WSW	SSW	SSW	SW	WSW	C	WSW	C	SSW	SW	SSW	SSW	SSW	SSW	SSW	S	S	S	S	S	SSW	33		24
	SPEED	7	6	5	5	4	2	3	4	3	0	3	0	3	3	3	3	2	3	2	3	3	3	3	3			3.3	
18	DIRECTION	C	S	S	S	C	S	S	C	S	SSW	SSW	C	SSW	SW	SW	SW	SW	SSW	S	SW	S	S	S	S	S	45		24
	SPEED	0	3	3	3	0	2	2	0	2	3	2	0	4	4	6	5	5	7	6	6	3	3	3	3			3.3	
19	DIRECTION	S	S	C	C	C	S	S	S	S	S	S	S	SSW	SW	SW	S	S	S	S	S	S	SSW	S	S	S	70		24
	SPEED	3	2	0	0	0	2	2	4	3	3	3	3	4	4	4	4	6	7	8	5	4	2	4	4			3.6	
20	DIRECTION	SW	SSW	S	SW	SW	SW	SW	SW	SW	SW	SW	SW	SSW	SSW	SW	SW	S	S	S	S	S	S	S	S	SW	45		24
	SPEED	3	2	3	4	4	5	5	7	7	7	6	5	5	4	4	5	9	5	3	3	5	5	5	4			4.8	
21	DIRECTION	SSE	SSE	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	SSW	S	SSW	S	C	S	S	79		24
	SPEED	3	5	5	5	5	4	6	6	6	7	6	9	6	8	12	6	6	7	7	3	0	3	4	4			5.7	
22	DIRECTION	S	S	S	S	S	S	SSW	SSW	SW	SSW	SSW	SW	SSW	SW	SW	SW	SW	S	S	S	S	S	S	C	S	50		24
	SPEED	3	4	4	5	4	4	3	4	5	3	2	3	3	4	4	4	3	4	6	7	6	4	2	0			3.9	
23	DIRECTION	C	C	C	S	C	SW	C	C	C	C	SSW	SSW	SSW	SW	SW	SW	SSW	SW	SSW	SSW	S	C	C	C	C	45		24
	SPEED	0	0	0	2	0	3	0	0	0	0	2	2	3	3	5	4	4	4	4	3	3	0	0	0			2.5	
24	DIRECTION	SW	C	C	S	C	S	C	C	C	SSW	SSW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	58		24
	SPEED	2	0	0	3	0	2	0	0	0	3	4	5	5	7	8	7	8	9	7	5	6	6	6	6			4.5	
25	DIRECTION	SW	SW	SW	SW	SW	SW	SW	SW	SW	SW	WSW	WSW	WSW	W	W	WSW	WSW	SW	SW	SSW	W	C	SW	SW	SW	58		24
	SPEED	6	7	8	8	7	7	7	6	6	5	5	5	5	6	5	7	4	9	5	2	7	0	5	7			5.8	
26	DIRECTION	SW	WSW	WSW	C	C	C	C	C	N	N	N	N	NNW	NW	NW	NW	NW	NW	NW	NW	C				NW	33		21
	SPEED	6	2	2	0	0	0	0	0	4	4	2	2	4	4	3	4	2	3	5	3	0						2.8	
27	DIRECTION									NNW	N	NNW	NNW	C	C	C	NNW	NW	NW	WNW	C	C	C	C	C	C	50		16
	SPEED									16	4	3	4	0	0	0	3	3	3	3	0	0	0	0	0			2.9	
28	DIRECTION	SSW	SW	C	C					N	C	C	C	SW	SSW	SSW	SW	SW	SW	SSW	SW	S	S	S	SW	SW	35		20
	SPEED	8	3	0	0					8	0	0	0	3	3	4	5	5	5	2	3	3	3	3	4			3.2	
29	DIRECTION	SW	WSW	WSW	C	SW	C	C	C	SSW	S															C	40		10
	SPEED	4	4	8	0	2	0	0	0	2	3																	3.0	
30	DIRECTION																												
	SPEED																												
PREV.DIR,		C	C	C	C	C	C	C	C	SW	C	SSW	C	SSW	SW	SW	SW	SW	SW	SSW	C	S	C	S	C				
PC,OF OCCUR,		44	44	52	48	46	35	38	38	22	24	18	18	29	36	29	25	22	27	21	25	39	33	37	41				
AV, SPEED		3	3	3	3	3	3	3	4	5	4	4	5	5	5	5	5	5	5	5	4	3	3	3	3			3.8	
HOURLY MAX,		8	7	8	8	10	10	9	9	16	9	11	10	12	10	12	9	9	9	8	9	7	8	12	7	MONTHLY HOURLY MAX			16
PEAK SPEED		97	11	97	97	97	13	10	12	97	11	14	13	14	14	16	12	19	15	13	11	12	18	23	9	MONTHLY PEAK SPEED			97

Fig. A1 — NRL Air Monitoring Station (Continues)

JUNE 1976
MONTHLY WIND ROSE

LONG. 77 01# 41## W
LAT. 38 49# 22## N

UTM 324,40C METERS EASTING
4,298,70C METERS NORTHING

GROUND LEVEL TO PROBE - 60 FEET

SPEED GROUPS (MPH)	PERCENTAGE BY DIRECTION N (1)	NNE (2)	NE (3)	ENE (4)	E (5)	ESE (6)	SE (7)	SSE (8)	S (9)	SSW (10)	SW (11)	WSW (12)	W (13)	WNW (14)	NW (15)	NNW (16)	CALM (17)	ALL DIR. (1-17)
00,0 - 03,4	0,9	1,8	0,8	0,6	0,0	0,2	0,2	1,2	7,8	5,0	2,8	1,4	0,3	0,3	1,1	0,8	25.4	50.5
03,5 - 07,4	2,0	1,7	1,5	1,7	1,8	0,5	1,1	1,4	7,6	4,3	12,4	2,0	0,9	0,3	1,2	1,2	0.0	41.4
07,5 - 12,4	0,2	0,3	0,5	0,8	0,6	0,0	0,0	0,0	0,9	0,3	3,2	0,6	0,2	0,0	0,2	0,2	0.0	7.8
12,5 - 18,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,2	0.0	0.2
18,5 & EVER	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0.0	0.0
P.C. ALL GROUPS	3,1	3,8	2,8	3,1	2,4	0,6	1,2	2,6	16,4	9,6	18,3	4,0	1,4	0,6	2,4	2,3	25.4	100.0
AVERAGE SPEED	4,0	4,3	5,2	6,0	6,9	4,6	5,3	4,0	4,1	3,6	5,6	4,8	5,7	3,7	4,3	4,9	0.0	3.5

DIRECTION - REPORTED AS PERCENTAGE OF AVAILABLE READINGS OVER THE MONTH

HOURS IN MONTH = 720 PREVAILING DIRECTION = C

HOURS OF RECORDED DATA = 654 PERCENTAGE OF OCCURANCE = 25,4

PERCENT OF AVAILABLE DATA 90,8

Fig. A1 — NRL Air Monitoring Station